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AutoCAD interface. Commands input methods, the use of menus and tool bars. Work with layers. Points coordinates input methods.

Guidance for laboratory works for “Informatics and computer modeling basics” course /for foreign students of 2nd year studying by orientation 6.060102 «Architecture»/

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Theme: **AutoCAD interface. Commands input methods, the use of menus and tool bars. Work with layers. Points coordinates input methods.**

Purpose: **acquiring skills of work with layers, learning how to enter commands and points coordinates in AutoCAD**

Work order:

1. Create a new AutoCAD drawing and save it in the personal folder.

2. Create 10 layers (with names *layer1, layer 2 ..., layer 10*) with different colors.

3. For every layer:

- make it current,
- draw a circle with the identical center coordinates and diameters for all the layers.

4. Turn off all the layers, except for *layer1*.

5. Remove the circle drawn in the layer.

6. Turn on all the layers.

7. Create *layer11* and draw a rectangle with sides 14 and 24, the left lower corner coordinates are *0,0*. Enter the coordinates of the points using the mouse.

8. Create *layer12*. Draw a rectangle with sides 14 and 24 with the coordinates of the left lower corner are *0,0*. Enter the absolute coordinates of the points with the keyboard.

9. Create *layer13*. Draw a rectangle with sides 14 and 24, the coordinates of the left lower corner are *0,0*. Enter the relative coordinates of the points with the keyboard.

10. Create *layer14*. Draw a rectangle with sides 14 and 24, the coordinates of the left lower corner are *0,0.* Enter the absolute polar coordinates of the points with the keyboard.

11. Create *layer15*. Draw a rectangle with sides 14 and 24, the coordinates of the left lower corner are *0,0*. Enter the relative polar coordinates of the points with the keyboard.

12. Save the drawing in the personal folder and compress it (**ZIP**).

13. Save this archive in the Academy distance learning system.

The User Interface

You can use several menus, shortcut menus, toolbars, and the dashboard to access frequently used commands, settings, and modes.

Toolbars

Use buttons on toolbars to start commands, display flyout toolbars, and display tooltips. You can display or hide, dock, and resize toolbars.

Toolbars contain buttons that start commands. When you move your mouse or pointing device over a toolbar button, the tooltip displays the name of the button. Buttons with a small black triangle in the lower-right corner are flyout toolbars that contain related commands. With the cursor over the icon, hold down the left button on your mouse until the flyout toolbar is displayed.

The Standard toolbar at the top of the drawing area is displayed by default. This toolbar is similar to those found in Microsoft Office programs. It contains frequently used AutoCAD commands such as PROPERTIES, PAN, and ZOOM, as well as Microsoft Office standard commands such as New, Open, and Save.

Display or Hide, Dock, and Resize Toolbars. AutoCAD initially displays several toolbars such as

- Standard toolbar

- Styles toolbar
- Layers toolbar

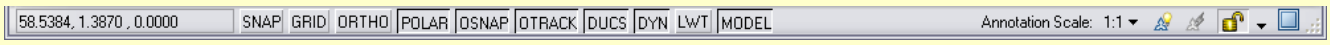
You can display or hide these toolbars and additional ones, and you can save your selections as a workspace. You can also create your own toolbars.

A toolbar can be floating or docked. A floating toolbar is located anywhere in the drawing area, and you can drag a floating toolbar to a new location, resize it, or dock it. A docked toolbar is attached to any edge of the drawing area. You can move a docked toolbar by dragging it to a new docking location.

Status Bars

The application and drawing status bars provide useful information, buttons for turning on and off drawing tools.

The application status bar displays the coordinate values of your cursor along with several buttons for turning on and off drawing tools and may display tools for scaling annotations. You can choose which buttons you want to display in the status bar.

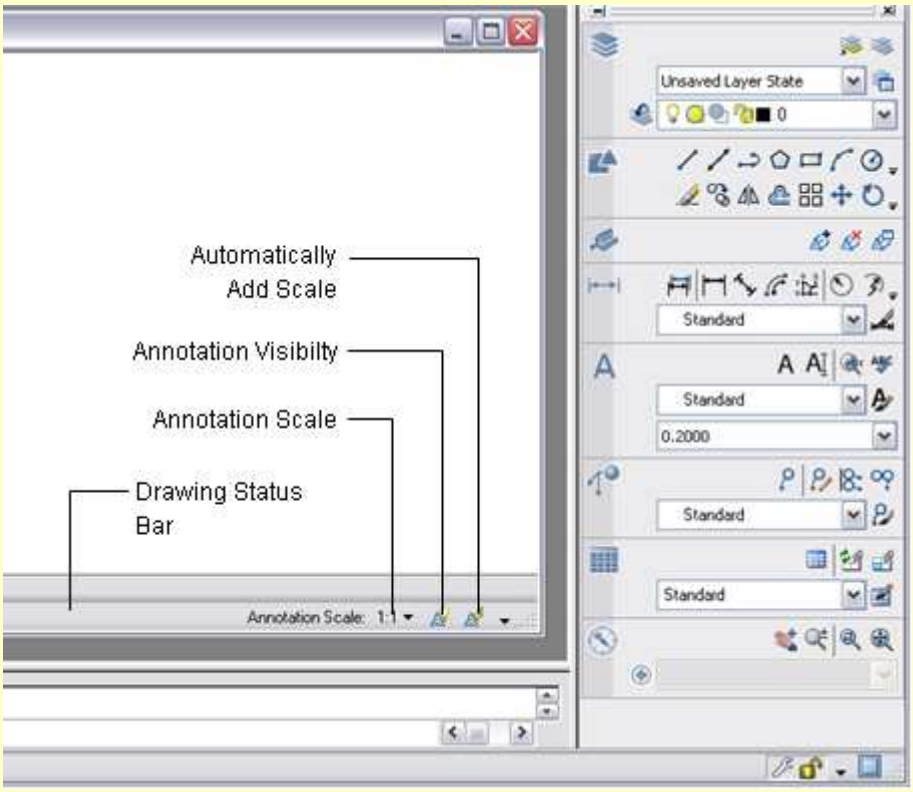


The drawing status bar displays several tools for scaling annotations.

Different tools display for model space and paper space.

When the drawing status bar is turned on it displays at the bottom of the drawing area. When the drawing status bar is turned off, the tools found on the drawing status bar are moved to the application status bar.

When the drawing status bar is turned on, you can use the Infobar menu to choose which tools display in status bar.



The Menu Bar

Display pull-down menus from the menu bar using one of several methods. You can also specify alternate menus.

Menus are available from the menu bar at the top of the AutoCAD drawing area.

To use a menu choose one of the following methods:

- On the menu bar, click a menu name to display a list of options. On the menu, either click an option or use the DOWN ARROW to move down the list, and then press ENTER.
- Press ALT and press the key for the underlined letter in the menu name; then, press the underlined letter in the option name. For example, to open a new drawing, press ALT and press F to open the File menu; then, press N for New.

You can specify menus to display in the program by customizing a CUI file and loading it into the program.

Shortcut Menus

Display a shortcut menu for quick access to commands that are relevant to your current activity.

You can display different shortcut menus when you right-click different areas of the screen, including

- Within the drawing area with or without any objects selected
- Within the drawing area during a command
- Within the text and command windows
- Within areas and on icons in DesignCenter
- Within areas and on text in the In-Place Text Editor
- On a toolbar or tool palette
- On the Model or layout tabs
- On the status bar or the status bar buttons
- In certain dialog boxes

Shortcut menus typically include options to

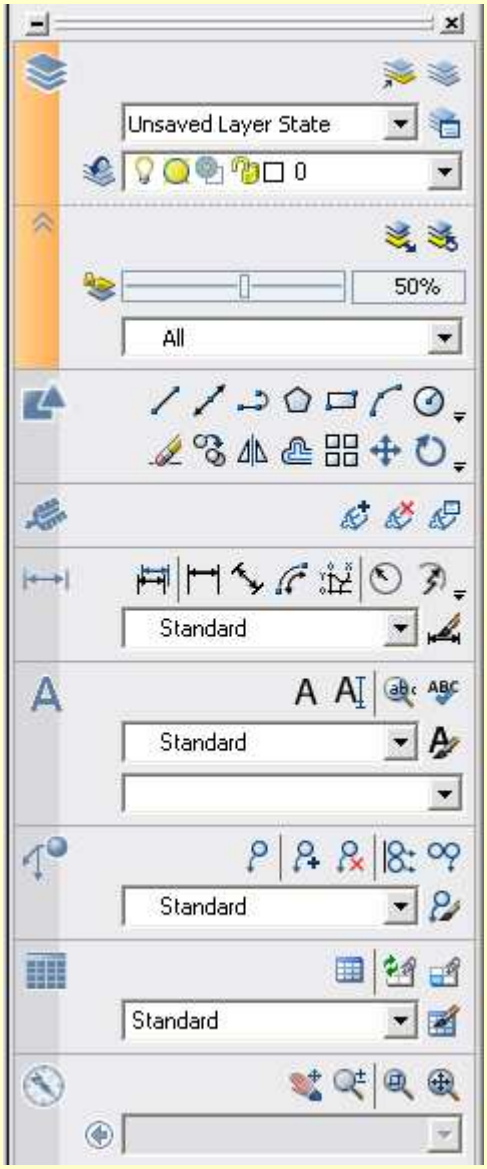
- Repeat the last command entered
- Cancel the current command
- Display a list of recent user input
- Cut, copy, and paste from the Clipboard
- Select a different command option
- Display a dialog box, such as Options or Customize
- Undo the last command entered

You can customize right-click behavior to be time-sensitive, so that a quick right-click acts the same as pressing ENTER, and a longer right-click displays a shortcut menu.

Shortcut menus can be customized using a customization (CUI) file. The main CUI file is called acad.cui by default.

The Dashboard

The dashboard is a special palette that displays buttons and controls that are associated with a task-based workspace.



The dashboard provides a single interface element for operations that are relevant to the current workspace. The dashboard eliminates the need to display a lot of toolbars and reduces the clutter in the application window. Thus, you can maximize the area available for work, and use a single interface for speed and convenience.

The dashboard opens automatically by default when you use either the 2D Drafting & Annotation workspace or the 3D Modeling workspace. You can open the

dashboard manually:

- Click Tools menu ➤ Palettes ➤ Dashboard.
- At the Command prompt, enter *dashboard*.

The dashboard is organized into a series of control panels. Each control panel includes related tools and controls that are similar to the tools in toolbars and controls in dialog boxes.

The large icons displayed at the left side of the dashboard are called control panel icons. Each control panel icon identifies the purpose of the control panel. On some control panels, if you click the icon, a slide-out panel opens that contains additional tools and controls. An open slide-out panel closes automatically when you click another control panel icon. Only one slide-out panel is displayed at a time.

A tool palette group can be associated with each control panel. To display the associated tool palette group, click a tool or open a slide-out panel.

You can customize the display of the dashboard (display or hide, dock, and resize the dashboard) in the following ways:

- Size the dashboard horizontally. If not enough space is available to display all the tools in a row, a black down-arrow called an overflow control is displayed.
- Use the shortcut menu to control the auto-hide, docking, and anchoring behavior. With anchoring, the dashboard results is displayed as a narrow space-saving strip along the left or right edge of the drawing area.

You can customize the dashboard in the following ways:

- You can create and modify dashboard panels using the Customize User Interface dialog box.
- You can specify which control panels are displayed by right-clicking the dashboard and, on the shortcut menu, clicking or clearing the names of control panels.
- You can associate a customizable tool palette group with each control panel on the dashboard. Right-click the control panel to display a list of available tool palette groups.

Enter Commands on the Command Line

You can enter a command by using the keyboard. Some commands also have abbreviated names called command aliases.

To enter a command by using the keyboard, type the full command name on the command line and press ENTER or SPACEBAR.

Note. When Dynamic Input is on and is set to display dynamic prompts, you can enter many commands in tooltips near the cursor.

Some commands also have abbreviated names. For example, instead of entering line to start the LINE command, you can enter l. Abbreviated command names are called command aliases and are defined in the acad.pgp file.

To find a command, you can type a letter on the command line and press TAB to cycle through all the commands that begin with that letter. Press ENTER or SPACEBAR. Restart a recently used command by right-clicking on the command line.

When you enter commands on the command line, you see either a set of options or a dialog box. For example, when you enter circle at the Command prompt, the following prompt is displayed:

Specify center point for circle or [3P/2P/Ttr (tan, tan, radius)]:

You can specify the center point either by entering X,Y coordinate values or by using the pointing device to click a point on the screen.

To choose a different option, enter the letters capitalized in one of the options in the brackets. You can enter uppercase or lowercase letters. For example, to choose the three-point option (3P), enter 3p.

To execute commands, press SPACEBAR or ENTER, or right-click your pointing device after entering command names or responses to prompts. The instructions in Help assume this step and do not specifically instruct you to press ENTER after each entry.

If you want to repeat a command that you have just used, press ENTER or

SPACEBAR, or right-click your pointing device at the Command prompt.

You also can repeat a command by entering multiple, a space, and the command name, as shown in the following example:

Command: *multiple circle*

To cancel a command in progress, press ESC.

Many commands can be used transparently: that is, they can be entered on the command line while you use another command. Transparent commands frequently change drawing settings or display options, for example, GRID or ZOOM. In the Command Reference, transparent commands are designated by an apostrophe in front of the command name.

To use a command transparently, click its toolbar button or enter an apostrophe (') before entering the command at any prompt. On the command line, double angle brackets (>>) precede prompts that are displayed for transparent commands. After you complete the transparent command, the original command resumes. In the following example, you turn on the dot grid and set it to one-unit intervals while you draw a line, and then you continue drawing the line.

Command: line
Specify first point: 'grid
>>Specify grid spacing (X) or [ON/OFF/Snap/Aspect] <0.000>: 1
Resuming LINE command
Specify first point:

Commands that do not select objects, create new objects, or end the drawing session usually can be used transparently. Changes made in dialog boxes that you have opened transparently cannot take effect until the interrupted command has been executed. Similarly, if you reset a system variable transparently, the new value cannot take effect until you start the next command.

Enter Coordinates

Absolute and relative 2D Cartesian and polar coordinates determine precise

locations of objects in a drawing.

You can use absolute or relative Cartesian (rectangular) coordinates to locate points when creating objects.

To use ***Cartesian*** coordinates to specify a point, enter an X value and a Y value separated by a comma (X,Y). The X value is the positive or negative distance, in units, along the horizontal axis. The Y value is the positive or negative distance, in units, along the vertical axis.

Absolute coordinates are based on the UCS origin (0,0), which is the intersection of the X and Y axes. Use absolute coordinates when you know the precise X and Y values of the point.

With Dynamic Input, you can specify absolute coordinates with the # prefix. If you enter coordinates on the command line instead of in the tooltip, the # prefix is not used. For example, entering #3,4 specifies a point 3 units along the X axis and 4 units along the Y axis from the UCS origin. For more information about Dynamic Input, see *Use Dynamic Input*.

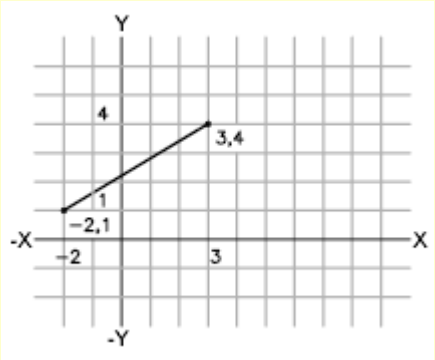
The following example draws a line beginning at an X value of -2, a Y value of 1, and an endpoint at 3,4. Enter the following in the tooltip:

Command: line

From point: #-2,1

To point: #3,4

The line is located as follows:



Relative coordinates are based on the last point entered. Use relative

coordinates when you know the location of a point in relation to the previous point.

To specify relative coordinates, precede the coordinate values with an @ sign. For example, entering @3,4 specifies a point 3 units along the X axis and 4 units along the Y axis from the last point specified.

The following example draws the sides of a triangle. The first side is a line starting at the absolute coordinates -2,1 and ending at a point 5 units in the X direction and 0 units in the Y direction. The second side is a line starting at the endpoint of the first line and ending at a point 0 units in the X direction and 3 units in the Y direction. The final line segment uses relative coordinates to return to the starting point.

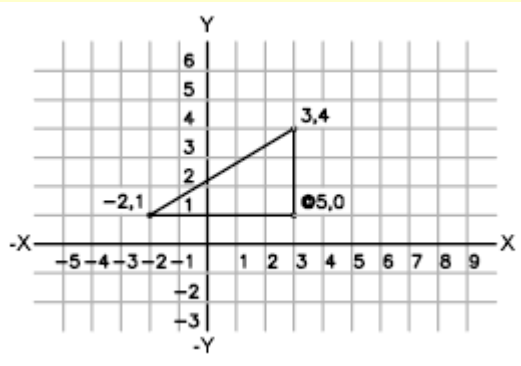
Command: line

From point: #-2,1

To point: @5,0

To point: @0,3

To point: @-5,-3

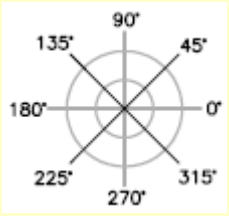


You can use absolute or relative ***polar*** coordinates (distance and angle) to locate points when creating objects.

To use polar coordinates to specify a point, enter a distance and an angle separated by an angle bracket (<).

By default, angles increase in the counterclockwise direction and decrease in the clockwise direction. To specify a clockwise direction, enter a negative value for the angle. For example, entering 1<315 locates the same point as entering 1<-45. You

can change the angle conventions for the current drawing with UNITS.



Absolute polar coordinates are measured from the UCS origin (0,0), which is the intersection of the X and Y axes. Use absolute polar coordinates when you know the precise distance and angle coordinates of the point.

With Dynamic Input, you can specify absolute coordinates with the # prefix. If you enter coordinates on the command line instead of in the tooltip, the # prefix is not used. For example, entering #3<45 specifies a point 3 units from the origin at an angle of 45 degrees from the X axis. For more information about Dynamic Input, see *Use Dynamic Input*.

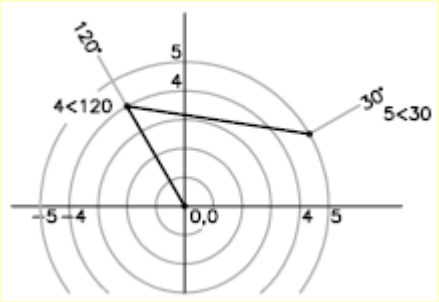
The following example shows two lines drawn with absolute polar coordinates using the default angle direction setting. Enter the following in the tooltip:

Command: line

From point: #0,0

To point: #4<120

To point: #5<30



Relative coordinates are based on the last point entered. Use relative coordinates when you know the location of a point in relation to the previous point.

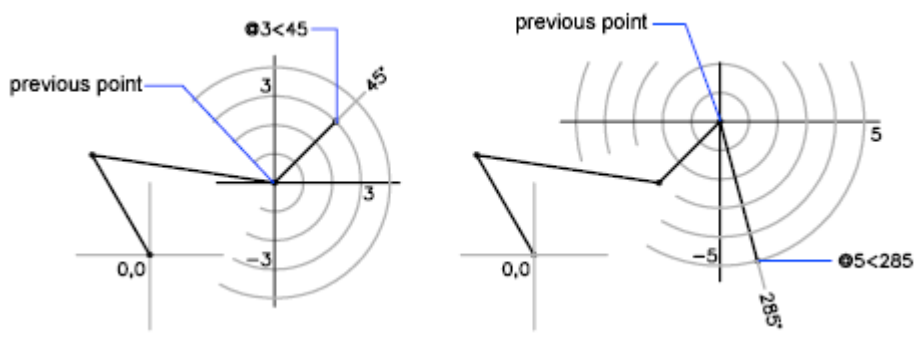
To specify relative coordinates, precede the coordinate values with an @ sign. For example, entering @1<45 specifies a point at a distance of 1 unit from the last point specified at an angle of 45 degrees from the X axis.

The following example shows two lines drawn with relative polar coordinates. In each illustration, the line begins at the location labeled as the previous point.

Command: line

From point: @3<45

To point: @5<285



Use Dynamic Input

Dynamic Input provides a command interface near the cursor to help you keep your focus in the drafting area.

When Dynamic Input is on, tooltips display information near the cursor that is dynamically updated as the cursor moves. When a command is active, the tooltips provide a place for user entry.

After you type a value in an input field and press TAB, the field then displays a lock icon, and the cursor is constrained by the value that you entered. You can then enter a value for the second input field. Alternately, if you type a value and press ENTER, the second input field is ignored and the value is interpreted as direct distance entry.

The actions required to complete a command or to use grips are similar to those for the command prompt. The difference is that your attention can stay near the

cursor.

Dynamic Input is not designed to replace the command window. You can hide the command window to add screen area for drawing, but you will need to display it for some operations. Press F2 to hide and display command prompts and error messages as needed. Alternately, you can undock the command window and use Auto-hide to roll open or roll up the window.

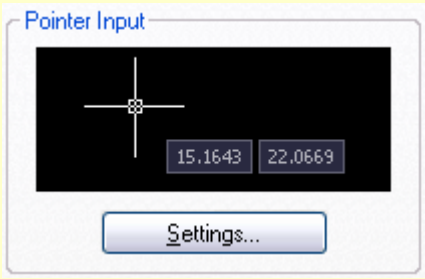
Turn Dynamic Input On and Off

Click Dyn on the status bar to turn Dynamic Input on and off. You can turn it off temporarily by holding down the F12 key. Dynamic Input has three components: pointer input, dimensional input, and dynamic prompts. Right-click Dyn and click Settings to control what is displayed by each component when Dynamic Input is on.

Pointer Input

When pointer input is on and a command is active, the location of the crosshairs is displayed as coordinates in a tooltip near the cursor. You can enter coordinate values in the tooltip instead of on the command line.

The default for second and subsequent points is relative polar coordinates (relative Cartesian for RECTANG). There is no need to type the at sign (@). If you want to use absolute coordinates, use the pound sign (#) prefix. For example, to move an object to the origin, for the second point prompt, enter #0,0.

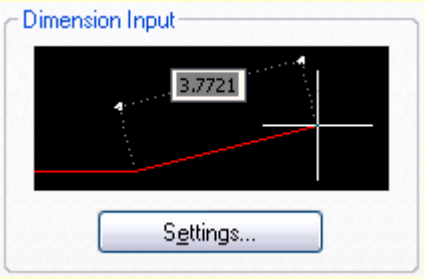


Use the pointer input settings to change the default format for coordinates and to control when pointer input tooltips are displayed.

Dimensional Input

When dimensional input is on, the tooltips display distance and angle values when a command prompts for a second point. The values in the dimensional tooltips change as you move the cursor. Press TAB to move to the value you want to change.

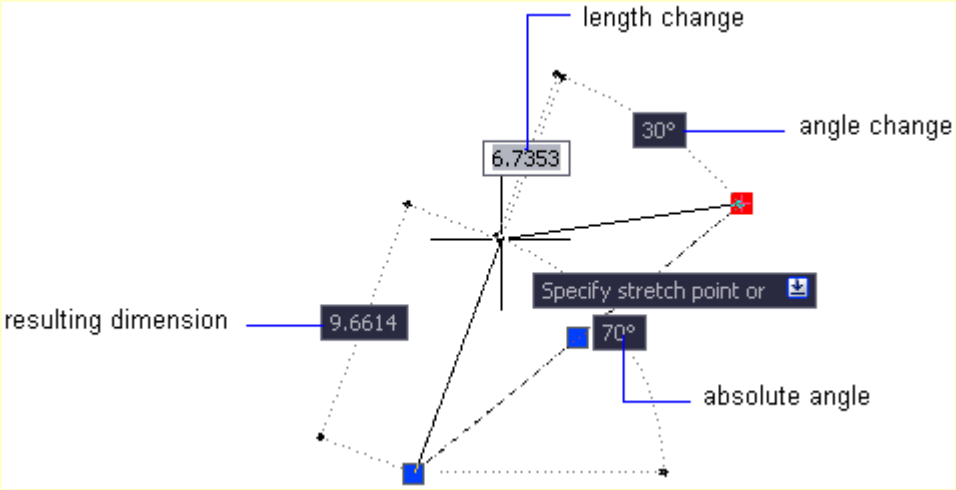
Dimensional input is available for ARC, CIRCLE, ELLIPSE, LINE, and PLINE.



When you use grips to edit an object, the dimensional input tooltips can display the following information:

- Original length
- A length that updates as you move the grip
- The change in the length
- Angle
- The change in the angle as you move the grip
- The radius of an arc

Use the dimensional input settings to display only the information you want to see.

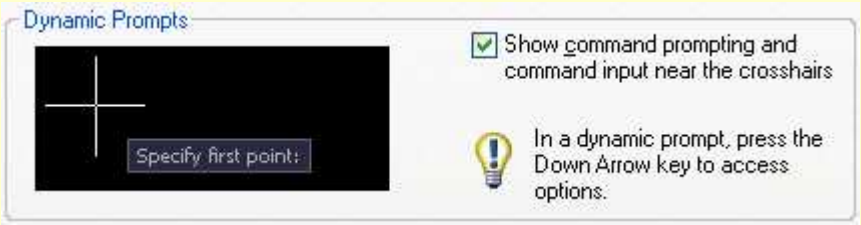


When you use grips to stretch objects or when you create new objects, dimensional input displays only acute angles, that is, all angles are displayed as 180 degrees or less. Thus, an angle of 270 degrees is displayed as 90 degrees regardless of the ANGDIR system variable setting (set in the Drawing Units dialog box). Angles

specified when creating new objects rely on the cursor location to determine the positive angle direction.

Dynamic Prompts

When dynamic prompts are on, prompts are displayed in a tooltip near the cursor. You can enter a response in the tooltip instead of on the command line. Press the DOWN ARROW key to view and select options. Press the UP ARROW key to display recent input.



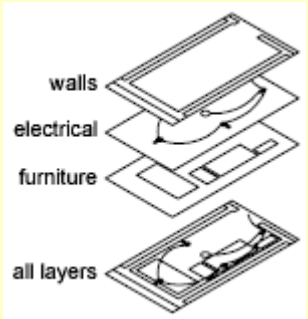
Note. To use PASTECLIP in a dynamic prompt tooltip, type a letter and then backspace to delete it before you paste the entry. Otherwise, the entry is pasted into the drawing as text.

Work with Layers

Layers are like transparent overlays on which you organize and group objects in a drawing.

Layers are used to group information in a drawing by function and to enforce linetype, color, and other standards.

Layers are the equivalent of the overlays used in paper-based drafting. Layers are the primary organizational tool used in drawing. You use layers to group information by function and to enforce linetype, color, and other standards.



By creating layers, you can associate similar types of objects by assigning them to the same layer. For example, you can put construction lines, text, dimensions, and title blocks on separate layers. You can then control the following:

- Whether objects on a layer are visible or dimmed in any viewports
- Whether and how objects are plotted
- What color is assigned to all objects on a layer
- What default linetype and lineweight are assigned to all objects on a layer
- Whether objects on a layer can be modified
- Whether objects display with different layer properties in individual layout viewports

Every drawing includes a layer named 0. Layer 0 cannot be deleted or renamed. It has two purposes:

- Ensure that every drawing includes at least one layer
- Provide a special layer that relates to controlling colors in blocks

Note. It is recommended that you create several new layers with which to organize your drawing rather than create your entire drawing on layer 0.

You can use layers to control the visibility of objects and to assign properties to objects. Layers can be locked to prevent objects from being modified.

You can reduce the visual complexity of a drawing and improve display performance by controlling how objects are displayed or plotted. For example, you can use layers to control the properties and visibility of similar objects, such as electrical parts or dimensions. Also, you can lock a layer to prevent objects on that layer from being accidentally selected and modified.

Control the Visibility of Objects on a Layer

You can make drawing layers invisible either by turning them off or by freezing them. Turning off or freezing layers is useful if you need an unobstructed view when working in detail on a particular layer or set of layers or if you don't want to plot details such as reference lines. Whether you choose to freeze layers or turn

them off depends on how you work and on the size of your drawing.

- *On/Off*. Objects on turned-off layers are invisible, but they still hide objects when you use HIDE. When you turn layers on and off, the drawing is not regenerated.
- *Freeze/Thaw*. Objects on frozen layers are invisible and do not hide other objects. In large drawings, freezing unneeded layers speeds up operations involving display and regeneration. Thawing one or more layers causes the drawing to be regenerated. Freezing and thawing layers takes more time than turning layers on and off.

In a layout, you can freeze layers in individual layout viewports.

Note. Instead of turning off or freezing a layer, you can dim the layer by locking it. See *Lock the Objects on a Layer*.

Assign a Default Color and Linetype to a Layer

Each layer has associated properties such as color and linetype that are assumed by all objects on that layer when the setting is ByLayer. For example, if the Color control on the Properties toolbar is set to BYLAYER, the color of new objects is determined by the color setting for the layer in the *Layer Properties Manager*.

If you set a specific color in the Color control, that color is used for all new objects, overriding the default color for the current layer. The same is true for the Linetype, Lineweight, and Plot Style controls on the Properties toolbar.

Lock the Objects on a Layer

When a layer is locked, none of the objects on that layer can be modified until you unlock the layer. Locking layers reduces the possibility of modifying objects accidentally. You can still apply object snaps to objects on a locked layer and perform other operations that do not modify those objects.

You can also dim the objects on a locked layer. This serves the following two purposes:

You can easily see what objects are on locked layers.

You can reduce the visual complexity of a drawing but still maintain visual reference and object snapping capabilities to those objects.

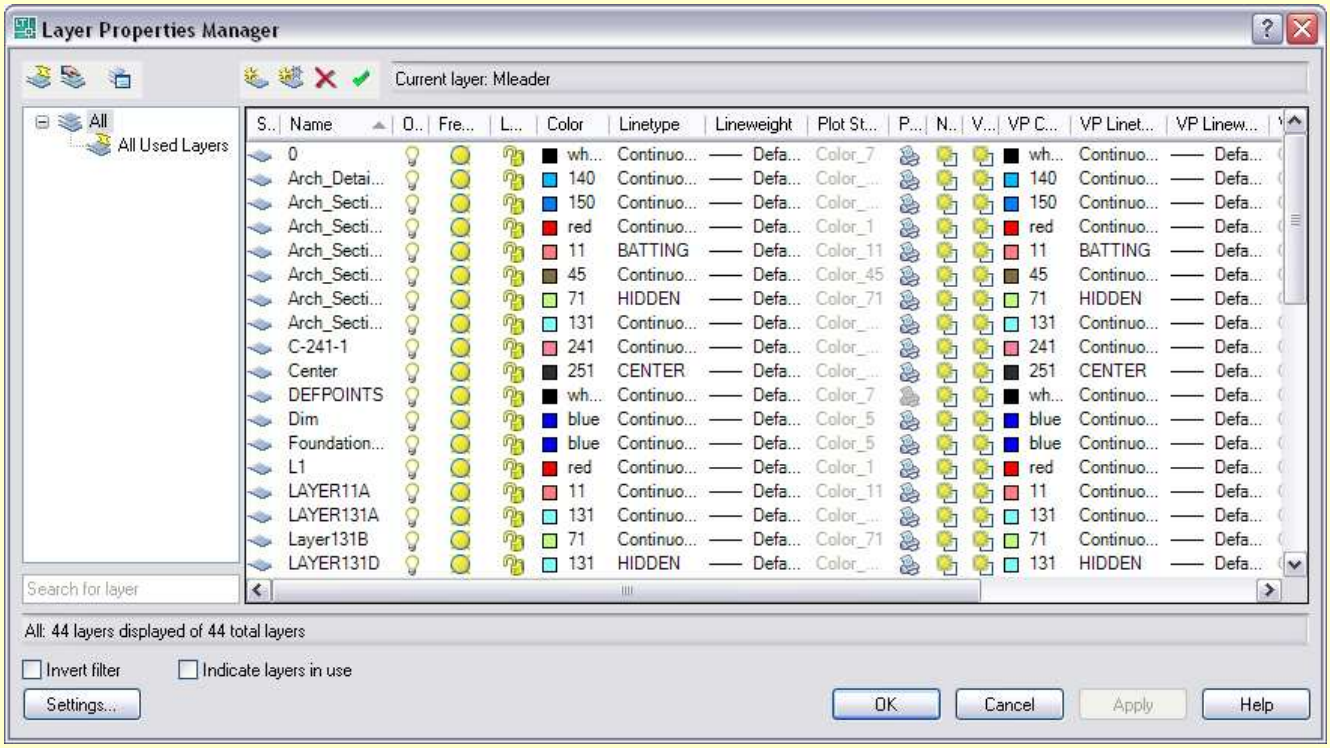
The LAYLOCKFADECTL system variable controls the dimming applied to locked layers. Locked layers that are dimmed are plotted normally.

Note. Grips are not displayed on objects that are on locked layers.

Layer Properties Manager

It displays a list of the layers in the drawing and their properties. You can add, delete, and rename layers, change their properties, set property overrides for layout viewports, or add descriptions. Layer filters control which layers are displayed in the list and can also be used to make changes to more than one layer at a time.

- New Property Filter displays the Layer Filter Properties dialog box, where you can create a layer filter based on one or more properties of the layers.
- New Group Filter creates a layer filter that contains layers that you select and add to the filter.



- Layer States Manager displays the Layer States Manager, in which you can save the current property settings for layers in a named layer state and then

restore those settings later.

-  New Layer creates a new layer. The list displays a layer named LAYER1. The name is selected so that you can enter a new layer name immediately. The new layer inherits the properties of the currently selected layer in the layer list (color, on or off state, and so on).
-  New Layer Frozen VP In All Viewports creates a new layer and freezes it in all existing layout viewports. This button is accessible from the Model tab or layout tabs.
-  Delete Layer marks selected layers for deletion. Layers are deleted when you click Apply or OK. You can delete only unreferenced layers. Referenced layers include layers 0 and DEFPOINTS, layers containing objects (including objects in block definitions), the current layer, and xref-dependent layers. Layers in a partially opened drawing are also considered referenced and cannot be deleted.

Note. Be careful about deleting layers if you are working on a drawing in a shared project or one based on a set of layering standards.

-  Set Current sets the selected layer as the current layer. Objects that you create are drawn on the current layer. (CLAYER system variable).

Навчальне видання

AutoCAD interface. Commands input methods, the use of menus and tool bars. Work with layers. Points coordinates input methods.

Guidance for laboratory works for "Informatics and computer modeling basics" course /for foreign students of 2nd year studying by orientation 6.060102 «Architecture»/

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